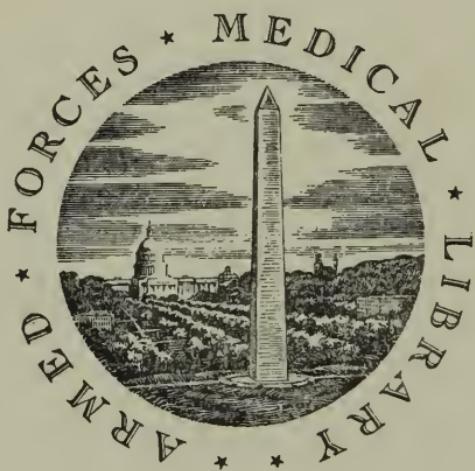


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B E L L

ON THE

SMALL-POX, &c.



AN

**ATTEMPT TO INVESTIGATE**

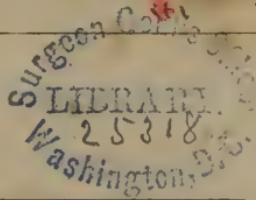
**SOME OBSCURE AND UNDECIDED DOCTRINES**

IN RELATION TO

**SMALL-POX,**

**VARIOLOID AND VACCINATION.**

**BY LUTHER V. BELL, M. D.**



**BOSTON :**  
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## ADVERTISEMENT.

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THE materials of the following pages have been in the gradual process of collection during the writer's attendance on several variolous epidemics within a few years past. They were intended merely as private memoranda, and would not have seen the light at the present time, except at the solicitation of several of his professional friends, to whom the class of diseases referred to has been rendered a subject of interest and enquiry, by reason of their recent and repeated appearance in our section of the country. He places his reliance for a favourable acceptance of his volume with the profession, only on its meeting the wants of those who have not heretofore been immediately interested in the examination of the topics of which it treats, and on the limited portion of origi-

nal facts and experiments he thinks he has adduced. Nothing systematic in its arrangement has been attempted, nor has it been within the compass of his design to touch upon more than a few of the interesting questions and obscure circumstances, so many of which characterize the variolous and varioliform diseases.

L. V. B.

DERRY, N. H. JAN. 1836.

## AN ATTEMPT, &c.

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*Importance of the study of variolous diseases to the  
New-England practitioner.*

To those of the medical profession engaged in practice in the interior of New-England, small-pox for the last thirty-five or forty years, has been almost an unknown disease, as far as personal experience is concerned; and this remark holds true to a considerable extent in our cities and seaport towns.\* Indeed, since the introduction of vaccination, the student of medicine has been tempted to pass over the leaves of his text-book containing the detail of this loathsome and fatal disease, as he does those relating to the plague, the black-death of the sixteenth century, or the sweating sickness;—considering it as a form of epidemic, if not absolutely extinguished, as but little likely to come within the immediate sphere of his duties; and to be regarded as a topic, not so much of practical importance, as of medical literature; and therefore that it may safely be reserved for that period of

\* The number of deaths by small-pox reported in the bills of mortality for Boston, according to Dr. Storer's tables, was only fourteen in nineteen years prior to 1832.

adequate leisure which the young practitioner anticipates, and generally is sure to find, at the commencement of his professional career. Should this period for investigation by chance never arrive, and this disease come upon him unsuspecting and unprepared, without its features being recognized, he will, besides the actual responsibility he has incurred, find a flood of popular odium pouring upon him, which can neither be resisted by reasoning nor by any subsequent self-devotion. The "enlightened public," as the newspapers so complimentarily term it, judges the physician in these circumstances very much as our legislatures have done in the business of dissection ;—*punishment* is prescribed for ignorance, and *punishment* for the sole mode (at least, so till recently) of acquiring information. Thus the practitioner who visits, however carefully, and with whatever precautions, a neighboring epidemic of small-pox, to witness personally its symptoms and character, is denounced as a wilful, and even mercenary, propagator of pestilence ! while, if the disease should occur within his own circle of practice, and he has had no former opportunity of witnessing it, woe be to him for his presumption in pretending to practice medicine, without being prepared for any emergency !\*

From probably a combination of near and more remote causes, such as the horrible inundation of foreign emi-

\* The writer has been led to make these remarks, not from any personal endurance of the consequences alluded to—having been early in the progress of medical pursuits thrown pretty extensively amongst variolous diseases—but from a wish that others may escape that opprobrium which

grants, which is desolating, morally and civilly, our country, the general neglect of vaccination, an actual and increasing change in the protecting power of the vaccine disease—which we shall have occasion to illustrate hereafter—as well as perhaps from some mysterious epidemic constitution of the atmosphere, the small-pox has within the last year or two appeared in an unparalleled number of places in New-England;—fifteen or twenty are at present recalled, and the number is believed to be still greater.

It then behooves the practitioner to keep himself well advised of the peculiarities and changing modifications of this disease; and this he can only do by keeping pace with the progress of science, as exhibited in recent works and periodicals; for if he relies on formerly acquired information and impressions in regard to many characteristics of the disease—such, for example, as the prophylactic powers of vaccination, or its modifying influences, or trusts to the text-books of even a quarter of a century since, he will soon find himself wandering in a maze of error.

The student of medicine and the young practitioner should never rest satisfied with their acquirements in this disease, till they have seen it “face to face.” However accurately plates may delineate, or however graphically books may describe the exanthemata, these are still aux-

he has so strikingly and repeatedly witnessed being cast upon judicious and respectable practitioners, who did not happen to be sufficiently acquainted with these maladies to recognize them at an early period of their appearance.

iliaries vastly inferior to ocular examination. There is, in small-pox especially, an expression of countenance, a peculiarity of odour, a *tout ensemble* of appearances, which are indescribable, but which once witnessed will be rarely forgotten or misapprehended. One thing is certain, rendering obvious the necessity of such information, that in a great majority of instances where I have known, or have been accurately informed of an irruption of small-pox in New-England, it has been unrecognized till irreparable injury and loss of life have been the results, to say nothing of the personal mortification to the practitioner attending, and the general discredit to the profession.

*General view of the ordinary phenomena of invasion, symptoms, and progress of natural small-pox.*

WHILE it is far from my design to attempt a monograph of variolous diseases, it seems proper, in an investigation such as is proposed, to refresh the reader's mind as to the common appearances of small-pox,—as a comparison of supposed eccentricities and modifications can be then more readily and accurately made, than when his recollections and impressions are somewhat erased and indefinite, as they are liable to be in those whose attention has not been immediately interested in the management of the disease.

The first symptoms of small pox are usually experienced about a fortnight after exposure. This period of in-

cubation, or interval between the reception of the various virus and the first manifestations of its morbific influence, is not uniform, being represented by authors, and no doubt accurately, as varying from six or eight to twenty-one days; the average length of time being about twelve or fourteen.

I had an opportunity of determining this period of incubation with more definiteness and certainty than is ordinarily practicable in populous towns, where more than one source of contagion may exist, in somewhat more than twenty cases of natural small-pox at Candia, N. H., during the spring of the present year. It was found to vary in these from ten to seventeen days from the first exposure, and indeed most of the cases were exposed but once. It may be remarked incidentally that in these cases no connection could be traced between the severity of the attack and the length of time the disease remained dormant after exposure.

The commencing symptoms do not essentially vary from those of ordinary febrile diseases of high action. The patient complains of weary, aching pains, in the back, lower extremities, and especially the loins; feels languid, chilly and restless, with a general sensation of *malaise*; occasional flashes of heat; pain in the head, particularly its front portion. The stomach is usually nauseated, with perhaps some vomiting; pain in the epigastric region, and tenderness on pressure, which some writers have considered a pathognomonic sign. After the lapse of a few hours, the fever becomes more developed;

the thirst is intense ; the heat of the surface burning ; the eyes heavy, watery and suffused ; the tongue and fauces dry ; the former covered with a white fur, except at the point, which is of a bright red ; urine scanty and high colored ; bowels torpid ; pulse high, frequent and bounding. The mind of the patient is dejected and confused ; or he is even comatose or delirious ; his sleep disturbed and troubled with *laborious* dreams.

These febrile symptoms continue during the first, second and third day ; but no criterion exists to discriminate the disease before the emergence of the eruption, which will be usually found to make its appearance on the evening of the third or morning of the fourth day ; when a great amelioration of the distressing symptoms is commonly experienced.\*

This eruption consists at first of small red points, or papulæ, resembling flea bites, which appear earliest on the forehead, the wrists, and around the mouth ; a few hours subsequently on the breast, arms and abdomen, and lastly on the lower extremities. In about twenty-

\* Dr. Brown, of New-York, whose opportunities for the study of variolous disease have been well known to the writer, remarks in his essay in the Medical Recorder, that the pathognomonic symptoms of small-pox, are *coldness of the hands and feet*, especially the latter ; obtuse pain about the epigastric region, and severe pain in the back. "This last symptom is a peculiarity of the confluent and bad cases, which appears to have been greatly overlooked by writers who have attempted to describe the disease" — "Experience has now enabled me to detect these cases almost invariably, which I have repeatedly done at the City Hospital, where cases of small-pox are excluded by the rules of the Institution. If a patient applies for admission, with febrile excitement, heavy, watery eye, hot skin, *cold hands and feet*, with pain in the *head and back*, I put the simple question,—Which pains the hardest, the head or back ? If the answer be the latter, I hesitate not to pronounce it the small-pox, and the sequel of the case generally proves it to be so." My observation corroborates the general pathognomonic character of these symptoms.

four hours the eruption is completed in point of numbers, and by this time the first papulæ have become sensibly elevated. Towards the end of the second day, and during the third, the papulæ have changed into vesicles, which contain a serous and limpid fluid ; the vesicles are umbilicated or depressed at the centre. About the fourth day they become surrounded by a pale red areola ; a gradual increase of the contained fluid is noticed, which between the fifth and seventh days becomes changed from a serous to a purulent character.

The progress of the symptoms varies from this time, according as the eruption is heavy or the reverse, which proportion forms the division generally recognized of *discrete* and *confluent* ; though these varieties fade into each other by insensible gradations, being mere differences of degree or severity, and not of specific character.

As the process of suppuration advances, taking in our description an average case as the unit, the vesicles, now become pustules, are swelled with their fluid contents, losing their central depression, and becoming even more projecting than hemispherical segments. The face begins to swell, especially in the parotid region and about the eye-lids, and the fauces are exceedingly sore, with obstructed deglution, and a copious viscid, salivary secretion. A strong, peculiar fœtor, which, like that of cancer, is unique and indescribable, but when once recognized never to be forgotten, exhales from the patient. The fever, which remitted when the eruption appeared, re-commences, except when the disease is very benign,

with the stage of suppuration, and is in degree in proportion to the amount of the eruption,—it being generally considered as connected with the absorption of the purulent matter of the pustules.

This secondary fever, as it is termed, continues till the period of desiccation, or drying of the scabs, which commences after the pustules have arrived at maturity, about the twelfth day, and apparently remained stationary for a day or two ; the first scabbing being noticed about the fourteenth or fifteenth day.

The different stages of the eruption are completed on the face from twenty-four to forty-eight hours in advance of the trunk and extremities.

The scabs are an uncertain time in falling off, depending on the amount of destruction the skin and subcutaneous cellular structure have undergone. Ordinarily a month elapses before the patient is freed from them, and a much longer period before the redness disappears, even when no *pitting* is produced.\*

\* Our readers may perhaps recollect an article in the medical journals and newspapers a year or two since, respecting the effect of exclusion of light in preventing pitting and scarring from the small-pox. A number of patients, it was stated, were admitted into the Charity Hospital at New-Orleans, in 1830, labouring under small-pox. They were placed in apartments which admitted the air, but excluded the light. The usual treatment was then adopted, and the account in the American Journal of Medical Sciences states, that "the result was, that when discharged not one of the patients exhibited a pit or mark on the body, the progress of the disease being greatly ameliorated by the plan. The experiment was repeated with equal success." I have had but one single case which I could subject to this experiment since the publication of the above report. I would have gladly tried to pursue what is such a desideratum in treating small-pox further, but none of the other patients under my care have been so situated as to warrant the experiment. At most seasons of the year, and under common circumstances, the impossibility of admitting cool air, and yet excluding light, will be obvious.

In the confluent form, the symptoms are all highly aggravated from even the commencement of the eruptive fever; no remission is experienced on the appearance of the eruption; the secondary fever is of a malignant typhoid type; the pustules less elevated, and less regular in form, aggregating in large masses, and separating in continuous crusts.

It is unnecessary for our purpose to pursue in detail the truly dreadful accompaniments and ravages of the severer forms of variola, or to allude to many occasional symptoms which occur in both forms, and all degrees. The present object is rather to revive a general outline, as was before intimated, for the purposes of comparison

The following case is presented as one toward the material of evidence on which the point can be determined.

#### CASE I.

SUSAN S., aged 17, unvaccinated, a remarkably healthy and good looking young woman, was seized the eleventh day after exposure with severe symptoms of eruptive fever, which eventuated in a confluent form of eruption, literally covering her face, scalp, neck, breast and arms. I saw her on the second day of the eruption. As the weather was so cool as to require fires, (March) I resolved to keep her apartment darkened, which was done by thick curtains—a free ventilation being secured from the neighbouring apartments. She was, when rational, which was most of the time, repeatedly instructed on the absolute necessity, as far as her future good looks were concerned, of resisting the disposition to abrade the scabs from the face, and means taken to prevent this during sleep, so that it did not occur. After a severe, and often doubtful disease, she recovered. In three weeks the scabs were removed from her face without leaving any *pitting* except those on her nose and middle of the forehead. The former were allowed to separate of themselves, which they were a week longer in doing. Those on the forehead I directed to be removed by a soft poultice, as they were producing a puckering of the skin. Similar cicatrices were left on both these places. This attempt then does not verify the New-Orleans experiments.

I have tried the method of M. Velpeau,—that of cauterizing the pustules with the nitr. argenti, to prevent unseemly cicatrization, and also that recommended by Mr. George, (Medico-Chir. Review, vol. xxiv., p. 59) viz. the application of some absorbant powder, as the calamine, and both with partial success. The application, however, which I have found most convenient and efficacious for this purpose, has been brown paper saturated with any mild oil, and applied to the face after the commencement of desiccation.

and reference, than to present any materials for prognosis or treatment to the practitioner, that being abundantly done in the common text-books of medical practice.

*Is small-pox ever of spontaneous origin?*

It is hardly necessary to remark, that the whole subject of contagious diseases, however much studied and illustrated of late years, is one of great mystery. This is especially exemplified in the monopathogenous exanthemata, or those which occur but once to the same individual. It has been generally believed, that these are derived only from exposure, more or less direct, to their like, and are never spontaneous or self-generated. As respects some of these, which must be supposed to be conveyed by the atmospheric influence over a wide space of country, it will be probably ever impossible to determine whether they are sporadic or very intensely contagious. For illustration,—the measles has been known to occur in places, like the clearing of a new settler, miles from any other inhabitants, and without any human communication being held. In respect to other diseases of a different intensity of contagion, we have a kind of negative evidence operating in favour of the supposition that they do not uniformly derive their origin from a common stock ; and even by referring them to such an original source, the difficulty is only removed one step further backward,—for we are bound to believe that a certain concatenation or combination of circumstances did produce the first cases, or original semina, of these diseases.

The small-pox has been found, by numerous experiments made with this specific object in England, which are detailed by Dr. Haygarth, by accidental evidence within the knowledge of various authors, and by facts within the observation of the present writer, not to be communicated through the atmosphere more than a few hundred feet at farthest, and in many instances to not even a small proportion of that distance. Now when we find it occurring at fifty or a hundred miles from any known seat of the disease, it would be very unsound philosophy to consider it as having been transmitted through the atmospheric influence, in the face of these negative proofs. We are then, in such circumstances, driven to suppose that it has been conveyed by some passing individual labouring under the disease, by the contagious influence lodged in some material substance, as clothing, &c., known as *fomites*, or that it has arisen spontaneously from some such combination of circumstances as produced the first cases on record.

The latter idea is not one which has had the countenance of the medical profession ; perhaps, however, it has been too generally dismissed after an *exparte* examination merely by writers. It is not intended here to express any opinion on this subject, which is doubtless one of more intricacy than importance. We give some facts serving towards a collection of materials on which future judgment may be rested. We do not consider so few facts as are yet on record on this point as enough to remove it from being yet *sub judice* in our own mind,

much less to authorize general conclusions. Hasty generalizations from a limited number of facts have ever been the bane of medical philosophising.

It is a curious circumstance that in the great proportion of variolous epidemics which have occurred in New-England within the past year or two, hardly a single one has been traceable to an unequivocal source of contagion. To any one who has been in the midst of an outbreaking of small-pox *in the country*, no evidence need be given of the anxiety and the researches of the public to investigate its origin. Were the stay of the pestilence dependant on the discovery of its source, no greater solicitude could be evinced. Yet in most of the cases referred to, the thousand and one tales always extant to explain this desired point, on examination fade into so little semblance of evidence, or even probability, that the medical journals or newspapers detailing the particulars do not even hazard a conjecture as to the origin.

In three instances, in which the writer has been called within a little more than a year, to determine the existence and advise measures for the prevention and treatment of the disease, this obscurity has existed, and been accompanied with such circumstances as to form at least some ground for the belief in its occasional spontaneous origin.

#### CASE II.

The first of these cases occurred at Manchester, in New-Hampshire, in a young man named DAVIS. He lived on a road by no means much traveled, and rarely

if ever by Irish emigrants from Canada, (a source to which all naturally look in the first instance, on the recurrence of small-pox) and had been absent from home but one night for six months prior to his attack ;—that night he spent at a large hotel in Lowell, in which town no case of small-pox had occurred for some years. Neither in going or returning did he come in contact with any one from whom it seemed at all probable he could have derived his disease. From the length of time, however, which elapsed after his return home, being about the average period of incubation, at which he sickened, it is very probable he acquired the seeds of the small-pox in his absence. Unfortunately his disease was not recognized till near a fortnight after his seizure, and formed the source of five other cases, three of which, as I was informed, proved fatal.

Here a difficulty presents itself. How could a source of contagion which would infect this individual, fail to communicate the disease to others? A general prevalence of vaccination might perhaps account for this; but it is a melancholy fact, that probably at the present time not one half of the population in New-England is thus protected. Yet a careful eye kept upon the public journals for this express object, proved that no other case of small-pox, except some immediately traceable to this, occurred in this section of the country for some months after ; for a longer period, in fact, than the disease is known ever to lay dormant; and such is the horror of

small-pox, that a single case never fails of finding its way into the newspapers.

### CASE III.

The next instance of the uncertain origin of small-pox occurred in WILLIAM TOWLE, an aged man, who lived on an obscure and bye road in Candia, N. H., rarely visiting his nearest neighbour, and not absent from the town for a great number of years. He was taken with small-pox about the 1st March of the present year, and formed the centre of an epidemic of about fifty cases, eight of which proved fatal. All the early part of these cases were traceable directly to intercourse with him, the first occurring on the eighteenth day of his sickness. Adding to the length of time, say six days, the shortest known period of incubation, and the earliest case after Towle, if considered as arising from the same source as his, would have had a period of twenty-four days' incubation, which is longer than is considered possible in any account of the disease. Hence it appears certain that they were all derived from him. Yet this individual was probably at no time absent from the rest of his family (consisting like himself of unvaccinated persons entirely) for ten minutes for months in the winter season. From the situation of the house and the habits of the inmates, no person could have spoken to him without their knowledge;—no garments or other property could have come in contact with him except through the agency of some unvaccinated individual. In this case no probable or even plausible explanation was to be devised. Even

supposing a transient individual to have brought the disease, in the ordinary progress of journeying, within ten, fifteen or twenty miles, in some direction, such person, in a section of the country generally unprotected by vaccination, must have left the disease in some dwelling where he would have rested ;—the next day, and each succeeding day of his march, a new nucleus must have been originated. But in truth, no case occurred in a circuit of an hundred miles, within a space of time longer than is consistent for the disease, in its well ascertained laws, to lie dormant. The fact that in this epidemic only one individual, unprotected by previous small-pox or vaccination escaped after being in sight of the suffering patient, would seem to afford the necessary presumption that an individual could hardly travel the country and not leave behind him a form of disease so peculiarly contagious as this.\*

#### CASE IV.

The third case I would adduce in illustration of the occasional inexplicable commencement of small-pox

\* I say *peculiarly contagious* in reference to this epidemic at Candia, as contrasted with others that I have witnessed; for like other exanthematous or malarious epidemics, the type of small-pox may vary as much in this particular as in the intensity of its symptoms. The only individual who, as just remarked, escaped after being in presence of the first patient, merely opened the door of his apartment, was so disgusted with the ravages which a severe confluent disease had made, that he at once recoiled, and left the house, was vaccinated soon after, and escaped. Others who were exposed, and subsequently vaccinated were, without exception, afflicted with some grade of variolous disease, none being saved by vaccination except this individual. Contrast this result with the epidemic I attended the preceding year at Litchfield, in which individuals to the number of eight or ten were preserved from any disease by vaccination, at no earlier period ;—amongst whom several had been exposed uninterruptedly for days to a highly infected atmosphere.

within my experience, occurred in the person of Mr. JOHN MOULTON, at Exeter, N. H., in May, 1835, (to which case I was called by the town officers, in consultation with Dr. Perry) a distance of twenty miles from, and more than thirty days after, its disappearance at Candia. He had not been absent from his own town for several weeks, nor, as far as he knew, had he been exposed to any probable source of infection, nor did any other case occur except in his own family. He died; some of the remainder, prepared by suitable treatment and vaccination, experienced a mild, modified disease, and recovered.

I give these cases simply as facts, without pretending to draw any general conclusions from them, or pretending even to conjecture, on the supposition of its occasional spontaneous origin, what circumstances act to produce such a result. The only valuable practical inference deducible from them is, that the practitioner, however remotely or obscurely situated he may be, should keep himself well advised as to the signs, prophylaxis and treatment of a malady which may come so unexpectedly upon him.

*To what extent is small-pox capable of being transferred by atmospheric conveyance, personal communication, &c.*

THESE questions and their proper solution are of a practical importance far beyond their interesting nature as connected with science. On the occurrence of small-pox in New-England a panic is at once produced which

surpasses that arising from almost any other cause, moral or physical. This alarm owes its origin to the nursery tales and ancient recollections of small-pox, as it prevailed in this country prior to and during the revolutionary war, and the almost entire absence of the disease for nearly forty years past;—it having occurred so rarely since the introduction of vaccination, that the minds of the community have not become enough familiarized with it, to deprive it of its horrors. It then becomes important to enlighten the public mind as to the real amount of existing danger, and to enable the authorities charged with the preservation of the public health, to discharge their duties so as to avoid alike the sustaining an alarm, harassing to the feelings and injurious to the affairs of the citizen, or running into the opposite extreme, of hazarding life and allowing a wide spread epidemic, by too lax measures of precaution. It is hardly necessary to remark, that judging from former experience, there is comparatively little danger in New-England of public injury occurring from the last named error.

On consulting the books, the physician who is called upon for the first time to originate rules for his own and the public guidance on this subject, will find but little to instruct him. The topic has been one which doubtless from fear of leading into error, and that of a fatal and irretrievable kind, authors have treated only in general terms, or have omitted entirely. Dr. Haygarth's experiments before alluded to, comprise almost all the definite facts I find in relation to its communication through the

atmosphere. The many popular histories of the mysterious conveyance of this disease the distance of miles by the smoke of fires in which infected matters were consuming, by the slight contact of individuals who had been in the vicinity of cases, or who had suffered from it months before, I shall consider as apochryphal, or, at least in my judgment, unproved. As far as I have had opportunities of scrutinizing and investigating the most probable of these statements, I find them not susceptible of proof, and in fact generally discredited by minute examination.

I will give some negative proofs of the limited extent of this contagion, deduced from my own experience.

#### CASE V.

A Mr. DeWitt, well known in some parts of the country as a lecturer on *mnemonics*, arrived late in the winter of 1830 at St. Augustine, E. F. from Charleston, S. C., where it was known that the small-pox was prevailing, although during his short stay there, a day or two only, he was not aware of having been exposed. In a few days he sickened with the disease, in a large boarding house, filled with vaccinated and unvaccinated persons, and contiguously surrounded by dwellings in which a vast proportion, probably nineteen twentieths, of the population were unprotected. Under the care of the late Dr. Cox, of Philadelphia, the disease was early detected, and access to his department debarred, except to the two negro servants who had been attending on him from the invasion of the disease. No case originated

hence, except in one of the negroes, (the other escaping, I believe, by vaccination after exposure) who was immediately removed to a lone house not more than forty rods from the barracks and compact part of the city.

A number of unprotected individuals visited Mr. D. after his sickness commenced, but prior to the eruption having appeared,—a fact hereafter to be referred to, as worthy of note, as regards the period of the disease at which it commences being communicable.

#### CASE VI.

In the family at Manchester in which Case II. occurred, the disease was mistaken for chicken-pox, nor was its true character decidedly ascertained till nearly a fortnight after the eruption, when the writer was called to examine the patient. Prior to this time the physician and other attendants mixed freely with unprotected individuals, but in no instance was the disease conveyed.

#### CASE VII.

In the case of Towle at Candia, who was sick with the small-pox three weeks before its detection, (which did not in fact occur until after his death and the appearance of the eruption in the second case) a great number of individuals called to see him ; many of them were subsequently attacked with the disease, but in no instance did they transport the infection from him to others.\*

\* One case occurred at some miles distance, in which the origin is very doubtful. As far as could be ascertained by the patient's denial just prior to his death, he had not been in contact with any individual who had seen the sick man, nor with Towle himself. Some circumstances, however, render it probable that he had been at Towle's dwelling.

On one occasion, more than a dozen persons, on their way to the annual election meeting, called and conversed with Towle, immediately pursued their course to a crowded meetinghouse, and spent the day there mingling with the people.

A young man who had been vaccinated, was in daily attendance on this patient, raising him in his arms, &c., and proceeded from thence to the district school, where he came in contact with near sixty unvaccinated children. These instances occurred amongst the humbler class of citizens; and as the disease was unknown, no precautions of changing dress, &c. were observed, yet no conveyance of the disease occurred.

The physicians in attendance for weeks before the nature of the disease was known, were also in the habit of proceeding to their other patients, and their own families, mostly unprotected, but without in any instance communicating it.

These facts would seem to offer as strong *negative* evidence as could readily be demanded, that the small-pox is not a disease *readily* communicable by the contagion adhering to an individual.

I am aware, however, that there are cases on record which apparently militate against this conclusion.

*On small-pox modified by the vaccine disease.*

It was early noticed after the practice of vaccination was introduced, that certain individuals were still liable to a disease of a varioliform character. For a considera-

ble period attempts were made to explain away these failures of the prophylactic influence of the vaccine disease, by considering them as cases in which no perfect vaccine disease had ever been experienced, or merely as aggravated instances of the chicken-pox. "As diffusion of the vaccine disease became more general," remarks Dr. Bell,\* "small-pox modified by it occurred with greater frequency, and cases are to be met with in great numbers in writers upon vaccination and varicella, when there is an evident contest in the author's mind, whether he shall follow the dictates of his own good sense, risk the charge of ignorance, and call the disease small-pox, or whether he shall follow the beaten track, and consider it varicella of a severe character. Dr. Willan† says, that in six years he saw seventy-four cases of chicken-pox which had been mistaken for small-pox after vaccination. In the present state of our knowledge of these diseases, no one can doubt but that the mistake lay upon the other side, and that probably all these were cases of small-pox modified by vaccination."

The experience of successive years compelled the admission, even from those who would at first held it a heresy to have doubted, that vaccination was by no means that entire preventive it had been believed, and overturned the Utopian dream which had been indulged that the disease which had from the earliest history of medicine formed

\* Boylston Prize Dissertation for 1825, by John Bell, M. D. of New-York, N. Y. Med. and Phys. Journal, vol. iv. p. 441.

† This was in 1806.

the grand outlet of human life would become entirely extinguished.

As far back as 1802, a spurious small-pox occurring after vaccination, is described as having been witnessed in France, in the *Journal de Medicine*, by M. Valentine; and soon after that date we find the acknowledgment of the London Vaccine Institution to the fact, that a proportion of their vaccinations proved failures, as far as absolute exemption from small-pox was concerned, though they arrived at a conclusion now sustained by accumulated and decisive proof, that these consecutive cases were always modified and mitigated, rarely if ever terminating in death. The proportion of these cases of modified small-pox, seems to have been steadily and progressively on the increase since they were first noticed. The annual reports of the London Small-Pox Hospital and Institution, from which the profession have derived much of the statistics of this disease, illustrate this increase. It appears from these that prior to December, 1802, eleven thousand eight hundred and upwards had been vaccinated, of which number twenty-five hundred were afterwards *proved* to be secured from the natural small-pox, by receiving a further inoculation with variolous matter, while they were at the same time exposed in a hospital full of its infection, without effect. Dr. Gregory, long the distinguished physician of the Institution, has given a table, from which it appears that the proportion of cases of small-pox after vaccination was as to the whole number of admissions as one to thirty in 1810;

as one to seventeen in 1815; as one to six in 1819; as one to four in 1821, and as one to three and a half in 1828.\*

In the United States the modified form of small-pox was noticed within a few years after the introduction of vaccination. More than twenty years since, it was sufficiently notorious in the city of New-York, as is manifest from the published report of the Medical Society, "On the epidemic small-pox and chicken-pox, which prevailed in New-York during the last autumn and winter, (1814—1815) explanatory of the supposed failures of the vaccine disease." Occasional, indeed not infrequent,

\* A late number of the Med. Chir. Rev. (Jan. 1834,) edited by Dr. James Johnson, gives the following view of the present state of the vaccine prophylaxis. We consider the doctrine here laid down, however, so absurdly *ultra*, that were it not for the high character, and the almost universally extended circulation of that journal wherever the profession of medicine is cultivated, we should hardly give it place here. It will at least serve to show, that the character of vaccination has not been looking up in England since the last report of the Vaccine Board the writer has been able to find. Dr. Johnson's Journal has in various numbers since repudiated, *in fact*, the absurd counsels of this, no doubt, contributor.

"Fifteen or twenty years ago it would have been thought useless to say any thing about the nature and treatment of variola, since we were then considered to be in possession of an infallible preventive, or at least substitute for that disgusting and disfiguring malady, in the mild disorder—VACCINIA. But it is not to be disguised, that time has greatly diminished the protective powers of vaccination; and we see so many instances of subsequent variola, and that of a very violent kind, that we greatly doubt whether if every lustrum or decade continues in the same ratio to exhibit failure, the public or the profession will, one hundred years hence, know any thing of cow-pox but from history!! We have been strenuous advocates for vaccination, and still continue to recommend it in preference to inoculation, when our opinions are asked; but we should be loth to urge it on parents in the same energetic manner we did fifteen years ago. To represent vaccination as an infallible or almost infallible preventive of small-pox is more than we would do; and we apprehend that it is more than is justifiable by any conscientious practitioner. There is one evil, (among some thousands of others) to which humanity is liable from the moment that man leaves his cradle—VARIOLA. Of the two preventives or substitutes, inoculation is the more certain but more severe; vaccination the more easy (free indeed from suffering) but the less powerful protector. If this estimate be not correct, it is at least honest."

instances occurred every year before 1824, which will be recollected as the epoch of numerous epidemics of small-pox, modified small-pox, and varicella, as well as of other exanthemata, in many parts of the country, and to a great extent in the cities of New-York and Philadelphia. The varioloid, or modified form, has appeared in France, Germany, Austria, and most countries on the continent of Europe. The repeated instances of its occurrence gave rise to the belief, both in Europe and this country, that it was a new disease; a vague impression of which still exists; and this was the occasion of its receiving the name of *varioloid*—as a disease not small-pox but resembling it. In France it was for a time generally believed to be a disease *sui generis*. M. Moreau de Jonnes believed it to be an importation from the East Indies, (Bull. des Sciences Med. Dec. 1826) and in many of the foreign journals it was common to read of widely spread varioloid epidemics.

The opinion of most, perhaps all, recent authorities, is that the varioloid disease and small-pox are identically the same. I cannot resist the wish to put on record some pretty decisive facts demonstrating this identity, which have occurred under my own observation.

#### CASE VIII.

A medical student, pupil of Dr. McNeven, of the College of Physicians and Surgeons, New-York, who had been vaccinated in infancy, took the small-pox from a body used for anatomical dissection, which appeared in well developed varioloid, running its usual course.

On the sixth day of the eruption, Dr. McN. took lymph from a pustule on this patient's arm, with which he inoculated a healthy boy, who had neither been vaccinated nor had had the small-pox. In due time the lad sickened ;—a true, distinct and benign small-pox eruption appeared, and passed progressively through its various stages.\*

#### CASE IX.

This case occurred in a patient at New-York in 1824 ; and I cannot do better than to give it, as well as the next striking instance, in the words of the physician, the results of, and deductions from, whose numerous cases of variolous disease, most of which it was my happiness to witness, have been formerly given to the public in a brief tract,† which for condensed investigation and apposite facts, I think I may say, without subjecting myself to the imputation of fraternal partiality, deserves a high grade amongst the researches on these subjects.

“ A quantity of lymph was taken on the point of a lancet from a patient suffering under small-pox after vaccination, on the third day of the eruption and fifth of the disease, and inserted in the arm of a healthy child of seven years of age, who had neither been vaccinated nor inoculated. Three days after the point where it was inserted became red and inflamed ; a small pustule followed, which contained a fluid on the eighth day. At this time

\* This case is also detailed in the N. Y. and Phys. Journal, No. 14, Art. vii. “ An attempt to ascertain the value of the vaccinal virus as a means of lessening the susceptibility to variolous diseases, with remarks, &c.” By Felix Pascalis, M. D. &c.

† Boylston Prize Dissertation, *supra* cit.

the child sickened and was confined to its bed. The next day about thirty pustules appeared on its body and extremities. But five of these pustules matured ; the rest gradually disappeared, and were entirely gone by the time the others were scabbed over. The child was afterwards inoculated with the small-pox without taking the disease.

#### CASE X.

“A young woman 22 years of age was vaccinated when a child. She was attacked with the usual symptoms of modified small-pox. For the first two days the fever was severe ; on the third an eruption appeared, amounting to about a hundred pustules on the whole surface. They soon after became vesicular, then horny or crystalline, and soon after disappeared. Six weeks after she was delivered of a dead male infant of five months, covered with marked small-pox eruption. The pocks, which in number exceeded one hundred, were elevated, flat on the top, and from one eighth to one fourth of an inch in diameter, and uniformly had a depression in the centre. The foetus, still in possession of Dr. Bogert, has been seen and examined by several medical men, who have unanimously pronounced it a case of pure small-pox, apparently at the third or fourth day of the eruption.”\*

\* A very interesting case of small-pox in the *fetus in utero* occurred in my practice last spring at Candia. Mrs R., advanced to the seventh month of pregnancy, was seized with small-pox, which assumed a severely confluent form. Notwithstanding a conjunction of severe moral and physical shocks, (having lost her husband and eldest daughter during her own attack) abortion did not occur. Dr. Samuel Sargent, her

## CASE XI.

Dr. H—— B——, a respectable physician at Londonderry, N. H., actuated by a laudable desire to examine a disease new in his circle of practice, visited at a distance of six or seven miles the patient Davis, whose case is related (Case II.) on the 18th April, 1834, being the twelfth day of his eruption. Fourteen days afterwards he began to have chills, pain in the head, fever, &c., followed by an eruption on the face and breast of so slight a character as never to excite a suspicion of the true nature of his malady, having presumed himself protected by a vaccination of some years standing,—a fair cicatrix of which was visible. On the appearance of this eruption of a few pimples, considered only as a slight cutaneous affection to which he had been subject, his feelings of indisposition were somewhat relieved, and he visited a patient at Litchfield, five miles distant, whose accouchment he attended. The eruption on the doctor was completed and removed in the short time peculiar to the varioloid affection.

After the expiration of thirteen days the patient at Litchfield, previously vaccinated, was attacked with a common varioloid disease, and about the same time her infant with the most terrible confluent small-pox, under which it sank in a few days. Another child, who slept in a bed in which the doctor laid down during his deten-

ordinary attending physician, has lately informed me by letter, that at the expiration of her full term, she was delivered of a healthy child, whose abdomen and thighs are marked with decided small-pox pittings, and which was insusceptible of the vaccine disease.

tion at the house, immediately after he had left it, had a severe attack of unmodified small-pox, and a number of other children in the same family, who were immediately vaccinated, more or less severe forms of varioloid. A neighboring female, unvaccinated, who was present at this accouchment, was at the common period attacked with severe distinct, or rather coherent variola.

The same fact was verified here which I have noticed in Mr. DeWitt's case (No. V.) There were several families, as usual at that time in that section, unprotected by vaccination, in which Dr. B. visited during the period of the eruptive fever, and in some undoubtedly after the early appearance of the eruption; but only in the one instance detailed was the disorder communicated, forming a strong probability that the disease is not communicable until some time after the emergence of the eruption. Other cases, illustrative of this doctrine, will be hereafter given.

I know no means of ascertaining the proportion of attacks of small-pox after *undoubted* vaccination, or even of making an approximation towards this fact. I am convinced that in my *country* practice, where some data exist for an opinion, the cases have not been by any means as proportionably numerous as in the European accounts for the last twelve or fifteen years. These cases have been about seventy in number; amongst them four only after former vaccination, that is, vaccination before exposure to the small-pox. Of the degree of immunity from death by small-pox afforded by the vaccine disease, the

evidence is conclusive and overwhelming; enough to sustain the triumphant character of the discovery and its author, and to put to shame the few who have dared in recent times to propose relinquishing it for the former practice of inoculation. *The general rule is*, the assertion may be safely hazarded, *that the vaccine disease is a perfect security against death from the small-pox*. The few undoubted instances of a fatal result are exceptions, only enough in number to strengthen it, the proportion being probably not one in thousands. Sir Gilbert Blane, on such a subject an unrivalled authority, at the time of publishing his "Statement of facts, tending to establish an estimate of the true value and present state of vaccination," which was in 1820 or '21, could find only two fatal cases proved. Mr. Cross,\* in the extended epidemic on which his work treats, witnessed no case of death in his own practice, nor could he *hear of* but two in that of others. In the epidemic of which Dr. Thompson has given the detail,† of three hundred and ten individuals who were affected with varioloid or small-pox after vaccination, only one died. The late Dr. John Bell, the results of whose extended experience in the epidemic at New-York in 1823—4 are given in the Boylston Prize Dissertation for 1825, could find no case of death in either of the four large cities of the Union in which it

\* A History of the Variolous Epidemic which occurred in Norwich in the year 1819, and destroyed 530 individuals, with an estimate of the protection afforded by vaccination, and a review of past and present opinions upon chicken-pox and modified small-pox. By John Cross, &c.

† Account of the Varioloid epidemic which has lately appeared in Edinburgh and other parts of Scotland, &c. By James Thompson, M. D., F. R. S., &c. &c. 1820.

had been prevalent, nor indeed a single case on record in this country. Since that time some occasional cases have occurred in that city and Philadelphia. A committee of the medical society of the latter place came to the conclusion that one case, and only one, occurred during the year 1827.\*

As this paper professes to give the results of some personal experience, the writer would state, that no instance of death when vaccination was made prior to exposure, has occurred in the more than two hundred cases of various disease he has attended, nor in a large number of others he has witnessed ;—in a very few instances a slight pitting has followed, never enough, however, to amount to a disfigurement of the countenance. Some cases, one of which will be hereafter detailed, in which the system seemed to give evidence of being under the influence of the vaccine disease, whilst labouring under the small-pox, (the vaccine virus being inserted after exposure) and in which death occurred, of course do not fall within this statement. A reference to the modern records of small-pox presents a volume of clear, minute and amply attested evidence to the general statement of the perfect immunity against death from small-pox, which is afforded by vaccination.

\* “ How triumphantly does this speak in favour of this prophylactic! Only one death from small-pox after vaccination has occurred in Philadelphia during the year 1827, among eighty thousand vaccinated persons, and during the presence of a most malignant and mortal small-pox, while several individuals have lost their lives from small-pox, after they had already gone once through the disease.”

*Symptoms and progress of varioloid, or modified small-pox.*

SMALL-POX when modified by vaccination loses much of that uniformity of character in the eruption and steadiness of progress which mark the unmitigated disease. The eruptive fever comes on similarly to that of pure small-pox, usually less severe, though frequently attended with a considerable degree of suffering. It runs irregularly for a period varying from two to five days, usually about three, before the papulæ are observed. These papulæ gradually increase in size, and in about forty-eight hours a portion of them present a conical vesicle, filled with a limpid, serous fluid, on an elevated base. After about the same lapse of time a portion of these vesicles are noticed to wither, and another portion burst, forming a thin yellow scab. Others become filled with a wheyey or puruloid fluid, which, however, never produces a secondary fever. In the last named pustules it is not unusual to witness the peculiar umbilicated or depressed centre, or a slightly cupped form. In three or four days dark coloured scabs are formed, which in a day or two longer fall off, the whole eruption being completed by the sixth, seventh or eighth day.

The number of papulæ and vesicles varies much, from ten or fifteen only to as many hundreds. In many cases an eruption of papulæ, vesicles and pustules may be seen interspersed amongst each other. Generally no permanent pitting results, nor is the characteristic foetor of the disease present. Some cases, however, approximate more closely to regular small-pox, in which both of these con-

sequences are the result. Other cases are wholly vesicular, and assume an almost exact similitude to varicella or chicken-pox.

The characteristic differences of varioloid may then be considered as the following;—the general irregularity of its stages, as evinced by the uncertain duration of the eruptive fever; the irregular appearance and continuance of the papulae, vesicles or pustules; the occurrence of all these forms simultaneously; the usual absence of a suppurative stage, and of secondary fever; the early period of desiccation, and in general the absence of foetor, pitting and danger.

Prof. Thomson in his work, and Eberle, and other writers I presume after him, speak of the occurrence of varioloid in persons who have neither had the small-pox nor the vaccine disease.

I have found no other detailed cases of such, as it seems to me, incompatible disease, in European or American authorities, nor have I within my own experience or personal knowledge ever known of any cases which would verify this opinion. Cases of varioloid after former small-pox are not infrequent; but their consideration presents nothing of interest to the practitioner in New-England, where such cases must necessarily be very rare.

*Degree of the vaccine prophylaxis where the vaccine virus is inserted after exposure to small-pox.*

UPON the irruption of small-pox, this becomes a point of deep interest to those who have been exposed in an

unprotected state. The books record but few facts to establish any very conclusive opinion how far vaccination will then be of utility. One thing is certain, that if the virus of both diseases is successfully inserted at the same period, that the small-pox is either almost universally mitigated or absolutely prevented. A more definite statement is hardly warranted in the present state of our knowledge. I have already alluded to the different results experienced in two epidemics ; in the one, in a great number of cases in which vaccination was performed after exposure to small-pox, all disease was prevented ; in the other, no preventive effect resulted, although a mitigating influence was experienced. In some of the varioloid cases the peculiar vaccine vesicle was not developed till after the patient was attacked with the premonitory symptoms of the modified disease. I have the minutes of cases in which there was no evidence of vaccination having taken, until the individuals had been exposed seven, eight, nine, ten and eleven days to small-pox in its most malignant form, yet a mild varioloid alone was produced. In these cases, however, the patients had been placed on a precautionary treatment and diet, and were usually vaccinated daily till it was evident the vaccine matter had taken, and that they were thus rescued from danger, as I have found from repeated experience that persons exposed within a variolous atmosphere are very insusceptible of the vaccine disease.\*

\* Since writing the above, I have seen one account (the first I have noticed) of this curious fact being noted ; a history of a small-pox epidemic which occurred in Northampton, Mass. in 1827—28, by Benjamin Barrett. Boston Med. and Surg. Journal.

In view of this insusceptibility to vaccination and the difficulty of obtaining recent vaccine virus, when the small-pox occurs in the interior, I am satisfied that it may occasionally be judicious and proper practice to inoculate with the small-pox such persons as have been decidedly exposed to the contagion, or who from circumstances may be compelled to remain for a length of time in an infected atmosphere. The disease by inoculation will not ordinarily compare in severity with a common varioloid affection, and the risk of failing to escape with so mild consequences as even this, if vaccination should fail, is incomparably greater than that of inoculated small-pox terminating fatally. In deciding, however, upon the course to be adopted in such cases, much will depend upon the circumstances in which the medical attendant finds himself placed. If he has a commodious hospital or pest-house at his direction, in which those who have been directly exposed to contract the small-pox can be retained, a resort to variolous inoculation will be justifiable ; and I am convinced, although I have never practised it, the more eligible course. On the other hand, should those who have been immediately exposed be scattered amongst the community, as will ordinarily happen, without the possibility of their being kept from mingling with unprotected persons, or rather with those who have not been exposed, inoculation of course would be out of the question. I would suggest as a rule for the government of those interested on these occasions, that vaccination should be performed daily or every other day

on such individuals up to the moment when either the vaccine or the variolous disease declares itself; at the same time, they should be placed on a rigid antiphlogistic regimen, and their symptoms closely watched, so that as soon as unequivocal evidence of small-pox was developed they should be instantly removed to an appointed pest-house, or place of separation. Connected with this subject is the important question,

*When does the small-pox commence being communicable?*

ON the occasion of an occurrence of a case of small-pox, the medical man in attendance will find that various individuals have been exposed to the first patient at various stages of his disease. Can it be determined at what period, if any, those thus exposed have not been subjected to taking the disease? If all who have been exposed are to be *quarantined* together, will not some be compelled by such contiguity and contact to suffer at least under a modified form of small-pox who otherwise might have entirely escaped? I have not found amongst the books I have consulted any data towards solving this question, of so much importance and responsibility.\* I have related one fact respecting this in the case of Mr. DeWitt, and another in that of Dr. B——, and will here subjoin two more instances in point, all which in my mind warrant the general inference that small-pox is not communicable during the eruptive fever, nor in the early period of the eruption.

\* Except in Heberden, who refers to this subject.

## CASE XII.

Dr. L——, of Candia, vaccinated a number of years, had visited the patient Towle, (Case III.) and after the usual period of incubation was seized with the ordinary precedent symptoms of small-pox. His indisposition was not enough to prevent his attention to his professional business, and he was with the writer (then engaged in the epidemic) in attendance an entire night on a fatal case of pneumonia, a mile from Towle's house. In the morning a distinct varioloid eruption of papulæ appeared on his forehead and breast, which run its course, a beautiful specimen of vesicular varioloid disease, the scabs forming directly from the serous effusion of the vesicles, without any pustular secretion. None of his patients who were visited during the existence of the eruptive fever in him, nor none of the family in which we were when the eruption was discovered, although numerous unvaccinated individuals were exposed, contracted any form of variolous disease. After the discovery of the eruption, it is hardly necessary to remark that no further exposures occurred from this source.

## CASE XIII.

During the progress of the epidemic just alluded to, I was sent for to visit a man named Stickney, at a part of Raymond seven miles distant from the neighborhood where the remaining cases were concentrated. I found him with an eruption, as afterwards proved, of the severest confluent character, destroying him on the seventh day of its progress. This became visible about twenty-

four hours prior to my arrival. He was surrounded by an unvaccinated family of two adults and three or four children, who had not been separated from him till the eruption attracted notice and alarm, and then only by removing him to a contiguous apartment, separated by a board partition merely. The patient was immediately removed and the family vaccinated. Whether the first vaccination *took* or not I do not know, but no case of small-pox or varioloid followed; and, as during this epidemic in every other instance where vaccination was not practised till after exposure to the small-pox, a varioloid disease resulted, is it not a fair deduction in this case that the patient was removed before the disease had arrived at that stage when it is capable of being communicated?

*On the causes of the failure of the vaccine in preventing the small-pox.*

THERE seems to be no doubt that cases of the occurrence of small-pox after vaccination were not infrequent from the very first periods of cow-pock inoculation; although from various circumstances before alluded to, these failures were disbelieved or explained away. Nor does there seem any want of the most authentic proof that this proportion has been constantly on the increase. A question of high interest and importance presents itself, What are the reasons for this deterioration in the protective powers? The answers which have been re-

turned to this question may be comprised under two heads: .

1. The vaccine virus has become deteriorated in its character by the succession of individuals it has passed through.
2. The vaccine disease has not, in the cases of failure, been perfectly experienced.

In connection with the first of these offered explanations, the suggestion naturally follows upon the desirableness of recurring to the original source of the vaccine disease, the peculiar malady of the cow or the horse, whichever it may be, to replace the virus which has become degenerated by time. There is reason to apprehend that from some cause or other, probably the difficulty of finding the disease in the animal, the experiment of obtaining a new supply from the cow has not been thoroughly attempted in those parts of Great Britain whence the original stock proceeded. I conclude this from not being able to find any detail of such attempts, and rarely any allusion to them in the English journals, and from the intimation recently made by Dr. Gregory, (the most eminent modern authority on varioliform diseases) in the London Medical Gazette, that the project has "only been talked of" in Great Britain without having been effected.

In this country, it is hardly necessary to observe, there is no opportunity of investigating this subject by actual experiment, as there is no account of the malady in the

brute animals which gives origin to the vaccine virus, having been discovered here.

As late as November, 1832, it would appear from a memoir by G. G. Macpherson, Esq. Surgeon in the Bengal service, published in the Calcutta Medical and Physical Transactions, and of which an abstract is given by Dr. Gregory, that this important point has been brought to the test of experiment in British India. A superintendent of vaccination learned that an epizootic existed amongst the cows at Moidapore, which the natives called by the same name which they applied to the small-pox in man. The following account is given of the disease: "The animals for a day or two appear dull and stupid. They are then seized with a distressing cough, and much phlegm collects in the mouth and fauces. There is no appetite for food, or at least an inability to eat. The suffering seemed to be the greatest on the fifth and sixth days, when there was considerable fever, and pustules made their appearance all over the body, especially on the abdomen. These went on to ulceration, the hair falling off wherever a pustule ran its course. The mouth and fauces appeared to be the principal seat of the disease, being in some instances one mass of ulceration, which in all probability extended to the stomach and alimentary canal. The mortality among the cattle in this epizootic was calculated at from 15 to 20 per cent." Scabs taken from the teats of the cow on the twelfth day afforded the virus with which eleven native children were inoculated. One only had a *true characteristic vac-*

*cine disease*, from which others were successively inoculated, and its authenticity tested by the insertion of the variolous virus, and by exposure to the small-pox. It would appear that the constitutional irritation and sympathetic fever were much more marked than in ordinary vaccination, which circumstance in fact forms the only reason for the belief that the protection was in any degree enhanced.

A report of the Royal Academy of Medicine, Paris, 1833, gives the attempts of M. Fiard to re-produce the vaccine virus. M. F. argues that if the vaccine virus were not degenerated, it ought to possess the property of being transmitted from man to the cow, and *vice versa*, equally now as when introduced into France. At the commencement of the present century it is stated the transmission of virus from man to the cow, and the reverse, frequently succeeded ; but latterly M. Fiard was able to inoculate only six or seven cows of seventy upon which he experimented ; in addition to this the eruption was excessively feeble, and the matter when re-inoculated on children never produced any effect. M. F. also received some cow-pox matter from England, with which, however, he failed to produce the disease in the animal in France by inoculation.

As a point at least of scientific research, it would seem desirable that farther investigation should be made on this subject, which from M. Fiard's experiments would seem to be very difficult, on account of the almost impossibility of procuring the natural cow-pox virus, it now

being a disease extremely rare in Europe. I am, however, satisfied that no deterioration of the vaccine virus has taken place from its passing through individuals in a long succession, from the following reasons :

1. The absence of evidence of any superiority of protection in the natural vaccine matter.
2. From the supposition of a deterioration being irreconcilable with the phenomena of small-pox, which loses none of its virulence by repeated inoculation ; however long it may have been transferred in this way, whenever it is received into an unprotected subject its character is unchanged.
3. The appearance, progress, symptoms, and resulting cicatrix of the cow-pox from the virus now, is precisely similar to what it was thirty-five years ago in this country and in Europe ; and here at least no pretence can exist that the natural source has ever been recurred to.

If then it be demanded, Why this alarming depreciation in the efficacy of the virus ? it may be answered, We do not know, or pretend to explain. We believe it to be one of those mysterious circumstances, of which so many, yet inscrutable, hang round the exanthematous diseases.\*

That the variolous and vaccine diseases are identically the same, but owe their specific differences to the former having passed through the system of the cow, was an

\* To an interrogator who asked Dr. Cheyne to explain how it happened that the measles never afflicted the same persons twice, the veteran replied, "Tell me why they have it *at all*, and I will then tell you why they have it only once."

opinion early agitated after the discovery of vaccination. Jenner seems to have been of this opinion, and the suggestion has been traced in many writers since. It is not a little surprising, that amongst the industry, zeal and talent with which this study was pursued, no well authenticated experiments on this subject are reported by the early writers, and indeed but few, and those rather unsatisfactory, are to the present day before us.

Richter (Spec. Therap. quoted by Eberle,) states on the authority of Gassner, "that variolous matter inoculated into the udder of the cow produced in them a pustular affection not to be distinguished from cow-pox." He, however, does not state, what is all important to any conclusion being deduced, whether the symptoms and prophylaxis of the vaccine disease were produced by the transfer of the virus from this source to the human subject.\*

The experiments of Dr. Sonderland of Bremen, attracted a good deal of notice in the foreign medical periodicals a few years since. His statements were at least sufficiently positive :

"The desire of physicians and governments to discover cow-pox in cows, in order to receive the vaccine lymph, is more than fulfilled by the discovery of a method of engendering cow-pox in the cow at will."

\* I find a reference in some of the writings on this subject to experiments by M. Grillon, a French surgeon, going to prove this identity of the vaccine disease and variola after having passed through the cow, and allusion to similar experiments by a Dr. Carpenter of Philadelphia. Being unable to examine the details, I know not what weight should be ascribed to these cases.

"It is now clear why in recent times cow-pox has been seldom or never seen in the cow. For the cow-pox of the cow arises merely from infection by the variolous exhalations from men recently affected with small-pox, and coming in contact with the cow." Dr. Sonderland took bed clothes on which a small-pox patient died, and put them on cows. On the fourth or fifth day the animals were found to have fever, and an eruption appeared on the udders, having the usual characters of cow-pox, and "which on insertion in the human species produced that disease."

"An infected bed cover is packed up and kept cool, so that the disease may thus be re-produced after two years."\*

These experiments, which would be so important, as testing the question of any deterioration of cow-pox matter, and enabling its re-production almost at will, and so interesting in a scientific point of view, as demonstrating the identity of small-pox and the vaccine disease, were repeated by M. Numann, Director of the Medical School at Utrecht, without his being able to obtain any similar results. His experiments may be found in the Medico-Chirurgical Review for January, 1831.

The writer made some attempts at verifying or discrediting these professed results of Dr. Sonderland, soon after their publication in this country. Matter from variolous pustules at different ages was repeatedly inserted in the udder of the cow, as well as into the uncovered part of

\* Boston Med. and Surg. Journal, vol. v. p. 290.

the nose of the horse. In no instance were any local or general symptoms produced.

The experiments of M. Numann were made by exposing the animals to the variolous infection in a different mode, which is obvious could not be repeated in New-England without much difficulty and hazard. It was by enveloping them in sheets from a patient in the suppurative stage of small-pox. In two of his three attempts, some kind of eruption seems to have been produced, which, however, was incapable of producing the vaccine disease in the human subject.

We fear we shall be obliged to enroll the reputed results of the Bremen physician among the "false facts" of medicine.\*

In order to account for the failures of vaccination, many explanations have been suggested in regard to an imperfection of the process. Authors have treated pretty extensively on a *spurious* form of the disease.

\*Since the above was written, I have been gratified to find another corroboration of the experiments testing the assertion of Dr. Sonderland. At the Science of the Academy of Medicine, Paris, in Oct. 1833, the report of some observations by M. Fiard, relative to the cow-pox, were read. Experiments were detailed, made by M. Cirard, member of the Academy at Alford, aided by the Director of the School, with the object of verifying those announced by Dr. Sonderland. "The linen, &c. it is stated, which had served several small-pox patients at the Hotel Dieu, was placed in contact with the bodies of six cows, a dog and a pig, for a period of time varying from twenty-four hours to seventeen days. The animals were also inoculated with the variolous matter contained in the linen. The cows exhibited no trace of secondary affection; and the dog and the pig also resisted, although these latter animals easily contract the disease by direct inoculation. The cloth, containing the variolous matter, was thrown out into a court containing a number of other pigs, and torn in pieces by them. After a lapse of twenty-three days, all the animals were attacked with an eruption exactly similar to the natural small-pox of the pig, and passing through its periods. Experiments of a similar nature were made at the same time on cows and sheep in a different quarter: not one caught the disease."

Dr. Good has even given it a place in his nosology, under the title of *vaccinia degener*. It is certain that all that is meant by this alleged new form of disease, is the occasional sore produced by the insertion of what is supposed vaccine matter, or of what is in fact so, into a constitution which from some peculiarity is incapable of receiving the vaccine disease. There seems to be no reason to suppose that this form of inflammation and suppuration does not arise from the application of unspecific morbid, perhaps purulent, matter. It has no characters of that definite, periodical, and almost unvarying character, that mark the exanthematous diseases. Take the distinctive character, for example, which Dr. Good has assigned to this, as he thinks, variety of cow-pock : Produced by inoculation ; vesicle amorphous or uncertain ; fluid often straw-coloured or purulent ; areola absent, indistinct, or confused with the vesicle ; scab formed prematurely—how does this differ from the effect of the puncture of any foul lancet ? And even if it had a distinct and specific character, does it resemble the cow-pox to a degree endangering any mistake in its symptoms, progress, or, least of all, in the resulting cicatrix ?

The disturbing the natural progress of the vaccine vesicle by the patient abrading it, as frequently happens from its itchiness, or by the vaccinator in removing lymph for future use, have been circumstances upon which much stress has been laid, as accounting for the failure of vaccination. The common fact that the cicatrix of vaccina-

tion, in a fair proportion of patients suffering under modified small-pox, is small, regular, and perfect, forbidding the idea of its being the result of any violence, seems answer enough to this suggestion. The danger of failure from this cause will be considered more fully when treating of the mode of vaccinating, it being connected with the manner of obtaining the virus for this purpose.

The presence of certain other cutaneous affections has been believed to be the occasion of the failure of vaccination, as regards the absolute production of a regular vaccine disease. This subject is far more worthy of examination than the two last mentioned ; indeed, it formed one of the last efforts of the immortal Jenner to support the triumphs and extend the advantages of his discovery.\* He gives it as his opinion, “ that a single serous blotch upon the skin, existing during the progress of the vaccine vesicle upon the arm, may occasion such irregularity and deviation from correctness, that vaccination under such circumstances cannot be perfectly depended upon.” “ I have found,” he further remarks, “ abrasions of the cuticle to produce the same effect ; such, for example, as we find in the nurseries of the opulent, as well as the cottages of the poor, behind the ears, and upon many other parts where the cuticle is thin.” Even a suppurating whitlow on the thumb he thinks prevented the proper developement of the vaccine vesicle.

\* See his Circular Letter to the Profession, Jan. 28, 1821, published in the Medico-Chirurg. Review, March, 1821.

The simple fact seems to be, that in not infrequent instances the insertion of *recent, genuine vaccine virus*, will fail to excite the vaccine disease, even when no perceptible or explicable circumstances exist. Every practitioner of experience must have met with cases where repeated attempts to excite the vaccine disease failed ; yet after a lapse of months, or a year or two, the individual became susceptible to the vaccine virus. An analogous fact was long since noticed in respect to the small-pox ; individuals who were long incapable of receiving it from continual exposure, even as nurses in a small-pox hospital or from inoculation, were eventually attacked by it in the most aggravated form. All we know about it is the fact itself ; nor for all practical purposes is further information necessary,—as in cases of urgency the prudent physician will repeat the vaccination daily, and with virus from different sources ; and in others, he will endeavour to satisfy himself that his vaccination has taken effect.

The opinion has been supported by a number of writers, and apparently on little better foundation than that hypothetically it seems well adapted to meet the facts, that the degree of protection afforded by the cow-pox is influenced by the effeteness of the virus from age, &c. Dr. Howison, vaccinator of the Royal Dispensary, Edinburgh, advances the general proposition, “ that the perfection and security of the vaccine vesicle will be in proportion to the freshness of the vaccine virus.”

That the “perfection” of the vaccine vesicle is not dependant upon the recency of the virus, I have demonstrated to my own satisfaction, by a series of operations made weekly, from matter obtained at the same time and from the same source, and continued on new subjects till it was wholly ineffectual from age. In progress, symptoms, cicatrix, insusceptibility to re-vaccination and to variolous inoculation, no appreciable difference was manifested between the first and the final cases. No doubt the more recent the virus is, the greater is the chance of its taking effect; for we well know that in no long period it becomes absolutely inert; but that when it does succeed the result is less perfect, is disproved.

That the “security” is diminished by the age of the matter, or in other words, that there are grades in the effects of the vaccine disease, affording different degrees of protection against variola, I disbelieve *in toto*—1st, from the absence of any experiments or evidence to prove or even render probable such an idea; and 2dly, from facts like the following. Children vaccinated at the same time, from the same virus, undergoing the same local and constitutional symptoms of vaccine disease, and finally left with the same cicatrix, have been found in my own practice to possess an entirely different degree of susceptibility to variolous contagion, some being exposed with impunity, whilst others have readily received the modified affection.

In regard to the perfection of the vaccine vesicle, as connected with security from the small-pox, or degree of

severity of the varioloid affection, Dr. Jenner long since remarked, "that the constitution loses its susceptibility to small-pox contagion, and its capability of producing the disease in its perfect and ordinary state, in proportion to *the degree of perfection* which the vaccine pustule has put on in its progress, and that the small-pox, if taken subsequently, is modified accordingly." Dr. Gregory\* also believes that the occurrence of small-pox, subsequent to vaccination, is dependant upon intensity of vaccine influence, as primarily exerted; and that the appearance of the cicatrix may be considered as the measure of that intensity. "In the investigation of the causes of small-pox subsequent to vaccination, it would be improper to overlook the remarkable connection that subsists between the degree of perfection in the vaccine cicatrix and the violence of the secondary disease.

When the scar on the arms is perfect, that is, distinct, circular, radiated and cellulated; but above all, when it is small, so that it may be covered with a pea, the secondary affection (if from peculiarity of habit or any other less ascertained cause, it does occur) will be slight, and hardly deserve the name of a disease.

On the other hand, whenever the scar is large, and bears the mark of having been formed by high local inflammation, and wants the other distinctive characters just enumerated, the chance of small-pox occurring in after life will be greater, and, *caeteris paribus*, there will be a stronger likelihood of its proving severe.

\* Medico-Chirurgical Transactions, vol. xii. part ii.

This principle receives a striking confirmation from what takes place in re-vaccination. Where the cicatrix is perfect, it is impossible, or nearly so, to re-produce the vaccine disease in any thing like its genuine form. In proportion to the imperfection of the cicatrix will be the degree of approximation of the second to the primary vaccination."

It would require no ordinary degree of assurance to gainsay the conclusions of these two master-authorities on these subjects. I would merely remark, that the observations which I have made, and which my friends who have had opportunities of examining these points in the United States have corroborated, do not correspond with these principles. The connection referred to, has not only not been generally maintained, but in many instances, one of which exists in my own person, has been directly controverted.

I believe that the whole truth on this subject lies within the compass of a nut-shell, and is simply this; that an individual has either had the vaccine disease, or has not had it; that there is no such circumstance as *half having* one of the *self-limited* and *specific* diseases, as *vaccinia* eminently is; that vaccination has failed entirely, and affords no kind of protection, or has succeeded entirely, and yields as much security to the individual as some idiosyncracy of his constitution, some peculiarity in the epidemic to which he is exposed, or some unknown, influencing cause, will admit.

As a corollary to this statement, it may be alleged,

that the cicatrix left by the vaccine disease communicated by the artificial insertion of the virus, is so peculiar and characteristic, that it forms a conclusive test of the subject having passed through that disease ; and that having once had such disease the individual is forever incapable of receiving unmodified small-pox, or a second vaccine disease—the instances to the contrary being properly considered, like the second attacks of the small-pox, as exceptions to a general rule.

*On repeated vaccination, its effects, whether it affords an increased prophylaxis, &c.*

THE opinion has been held by some very respectable authorities, that the degree of immunity afforded by the vaccine disease was enhanced by subjecting the system repeatedly to its operation—and, as they have expressed it, thus effecting a complete *saturation* with the vaccine influence. This belief seems to be based on certain experiments, in which, after ordinary vaccination, the operation was soon repeated ; a tubercle arose, which was deemed the result of a lesser susceptibility to the vaccine disease ; the process was renewed a third, fourth, or even fifth time, occasioning a less and less inflammatory action, till no other effect was produced than would arise from the mere puncture.

Were the result of this test uniform, it would go far to render this opinion probable ; but experience has demonstrated to me that a second vaccination frequently produces no soreness, whilst in individuals of a different

habit of constitutional health or cutaneous susceptibility to morbid impressions, this false vaccination will occur as many times as the arm is punctured with a lancet, touched with the vaccine or any impure secretion.

Facts which occurred a few years since on board the United States ship North-Carolina, which may be regarded as an experiment on this point on a large and accurate scale, would seem to be sufficient to set this question at rest forever. A crew of nine hundred men, most of whom had been vaccinated, or had had the small-pox, were shipped at Norfolk, Virginia; they were twice vaccinated before the ship sailed, a third time at Gibraltar, and, "to make assurance doubly sure," a fourth time at Port Mahon. "Notwithstanding," remarks Dr. Henderson, who details these facts, "this *ultra* re-vaccination, under such various circumstances of virus, climate, &c. one hundred and fifty-seven of the crew had the varioloid."

I am not aware of any facts which go to prove that individuals who have undergone this reputed *saturation* of the system, are any more exempt from the varioloid affection than those upon whom the process has been once successfully performed.

As before stated, I believe the vaccine disease is as incapable of being produced in an individual a second time as is the small-pox itself. I am aware that this doctrine does not correspond with that of many modern journal writers, or even with the detail of some experiments on a grand scale made amongst the European sol-

dier. We find many statements of the following kind, which is selected because it is more definite than the usual abstract given of such kinds of reports.

“Dr. Wolde, of Winser in Hanover, at a time of alarm tried the experiment of re-vaccinating one hundred persons, who had been carefully vaccinated, and who exhibited a perfect cicatrix. Twenty had a regular pustule, differing in no respect from a first vaccination; nine others had a modified disease, shorter in its duration, the lymph being coagulated, (?) and the areola formed as early as the seventh day. In thirty-one cases there was a slight local affection, lasting three or four days, producing a slight inflammation like a leech bite, followed by a small yellowish scab. Twenty-five had no local affection. In the twenty perfect cases, matter taken in *some* produced perfect cow-pox, *in others* no effect whatever.”

We know nothing of the authority of this writer, nor of his competency to judge of a “perfect cicatrix,” on which he gives no evidence except this statement; nor have we any further part of his essay than the above extract, from which we can judge of its *vraisemblance*. The last sentence is certainly very suspicious, and perhaps may form a key to the authenticity of the whole, as it would require more than a single authority to convince one acquainted with vaccination, that the matter from a *perfect* cow-pox vesicle would fail repeatedly to produce the vaccine disease in a proper subject. Some American accounts within the last year or two, give abundant

instances of what they represent to be a perfect vaccine vesicle on a second vaccination. The most cursory examination of these reputed cases will convince any one that the true vaccine vesicle is not well understood ; and that a cicatrix wanting in the true characters of the vaccine one, has been deemed adequate evidence of former vaccination.

When I find writers occasionally giving general unspecified statements of successful second vaccination, and that too in a proportion of cases infinitely greater than the common experience or my own observation corroborates, I am compelled, however uncivil it may appear, to doubt their having a definite and accurate idea of the evidences of having passed a first vaccination. For example : a correspondent of a New-England journal asserts that he had vaccinated many adults who had had the disease in infancy and childhood, and was surprised to find that in a *great majority* of cases a vesicle was formed, and that in many cases it went through its course, with little deviation from that of the original vaccine disease !

In none of these pretended instances of a second vaccination have I found any account of the *experimentum crucis*, which would at once establish their validity ; that is, the successful insertion of the matter from the second vaccine vesicle in the unprotected subject, which matter should be taken from a subject having a perfect vaccine cicatrix.

That the ordinary suppurative tubercle, which arises from the puncture of a lancet charged with the vaccine

virus, and which forms, in most of these cases, I have little doubt, what is considered the vesicle of a second vaccination, has little or no vaccine efficacy, is to me demonstrated by the attempts I have made again and again in vain, to produce the vaccine disease by the insertion of the matter taken in various stages of its progress into an unvaccinated subject.

In some cases when a vaccine vesicle actually exists after what is believed to be a former vaccination, the explanation will be found in circumstances which are familiar to every medical man. It is common for vaccination to fail; sometimes from unknown reasons, sometimes from the effeteness of the virus, and sometimes no doubt from the presence of cutaneous affections, &c. as explained by Jenner. A degree of common or perhaps morbid inflammation follows the puncture, which is mistaken by the careless or ignorant operator for the true effect; or the case is never afterward submitted to the practitioner, as the patient believes because *he has been vaccinated*, and his arm has been sore, that therefore he has had the cow-pox !\*

On points so mysterious and inexplicable as the relations of the exanthemata, reasoning is often impracticable. Experience must then be contrasted with experience; assertion met by assertion. In my own experience in

\* A physician within my knowledge vaccinated (!!) extensively in a parish, by forcing a bit of thread, presumed to be impregnated with the vaccine virus, into a gash so deep that in some instances the blood dropped off the patients' fingers. As might have been expected, no slight degree of inflammation and soreness followed; the patients were uniformly satisfied, and the operator's reputation exalted above his neighbors !

vaccination, limited by not less than probably a thousand cases, I have rarely known an instance of a true vaccine disease being produced where I found a satisfactory, well marked cicatrix. Nor have I ever known *unmodified* small-pox to occur in an individual who had this evidence of having been vaccinated.

It is true that the contrary of this statement has been again and again proved to be not conclusive ; that is, an individual, with a scar which has been found to be wanting in the true characters of the vaccine disease, has been shown, nevertheless, by a new vaccination, or even an inoculation of small-pox, to be insusceptible of vaccine or variolous disease—the evidence of the cicatrix being probably destroyed by abrasion, by ulceration, or some peculiarity of cutaneous structure, which prevented its being retained, in the same way that it might be removed by excision or accident, without affecting the constitutional influences which the vaccination had left. But whenever the cicatrix has been found to exist, there was no susceptibility to vaccine disease ;—the presence of it being proof of its adequacy, though its absence not always of the contrary.

*Does the vaccine protection become diminished or destroyed by age ?*

THE popular impression is that in a lapse of years after vaccination the system becomes again liable to receive the small-pox. For reasons which it would be difficult even to conjecture, this limit has been placed at

seven, at ten, and at twenty-one years. Even some respectable authorities have given a partial sanction to this idea. Dr. Leo Woolf, in Germany, has published a memoir on this subject, quoted by Dr. Eberle, in which he has adduced facts and reasonings to show that this influence is effaced by the constitutional changes which take place at the epoch of puberty; and Dr. Eberle, from facts which have come under his own observation, is inclined to believe that the prophylactic influence is gradually diminished in the system,—though he considers it as absurd to set a definite limit within which the gradual subsidence of this influence is accomplished, “since it may be supposed, that idiosyncracy, modes of living, and accidental as well as constitutional predispositions, and perhaps habitual extraneous influences, may give rise to much variation in this respect.”

A constant endeavour for a number of years to collect facts in relation to this point, has as yet produced no evidence in my mind of any change from the lapse of time. I have seen repeatedly the modified form of small-pox occurring in individuals who were only just through a decided vaccine disease, and in others when twenty, twenty-five and thirty years have elapsed; which proportion of cases, recent or long standing, has obtained to the greatest extent, I can hardly say. Thus I can state generally from personal experience, that I see no reason for believing that any alteration of the vaccine prophylaxis occurs, either from time or the changes of puberty.

The evidence of the books, however, goes to show that the greater length of time has elapsed, the greater is the security. Mr. Cross\* offers this as his opinion, and refers to two hundred and fifty cases of small-pox after vaccination, in the practice of Dr. Gibson, in which by far the greater number attacked were those vaccinated within two years.

Dr. Thompson's varioloid eruptions occurred at various intervals, from a few days to fifteen years, not warranting the suspicion that the preventive or modifying power of the cow-pox was weakened or exhausted by time:—increasing years appearing in general to lessen the susceptibility to small-pox contagion.”†

There does not seem to be any fair ground of pretence that the immunity is increased by age. The true rationale perhaps is, that the efficacy of the virus in recent times having been diminished, those recently vaccinated will be more apt, comparatively, to suffer from varioloid disease.‡

\* Op. supra citato.

† Med. Chirurg. Review, Sept. 1820.

‡ Dr. Millar, “Professor of the Theory and Practice of Medicine in the Washington Medical College, Baltimore,” has advanced the opinion (Medical Recorder, vol. xv. p. 133, et seq.) with no little confidence and assurance, as formed on extensive experience and observation, that in all those who become affected with varioloid, or second vaccine disease, the cicatrix of the first vaccination will be found to be a regular smooth white surface,—the punctuated marks which mark the genuine scar having been gradually obliterated. The duration of these marks of security he considers as very indefinite; “some wear as well after many years as in the first months; others fade in a few years, perhaps months; others, after a long endurance, sink suddenly into obscurity.” The examination of numerous instances of varioloid cases in the last epidemics I have attended, with a view to test this suggestion, has convinced me that it is utterly visionary and groundless.

*Co-existence of small-pox and cow-pox.*

NOTWITHSTANDING the modifying effect which the vaccine disease produces on the small-pox, either mitigating its symptoms or preventing its occurrence entirely, even when the vaccine virus is inserted many days after exposure, still there are instances of the simultaneous progress of these affections, apparently unchecked and uninfluenced by each other. It is manifest in these cases that the small-pox must have been received into the system some considerable time antecedent to vaccination, the period of incubation and whole progress of the vaccine disease being so much shorter than in the other.

Mr. Cross and other writers give a few instances of such co-existence, which is an important fact, as it affords a strong argument against the theories of those who have attempted to consolidate all the forms of vaccine, variolous and varicellous disease into one class as being identically the same. The following well marked case, occurred to me recently.

## CASE XIV.

ASA HUNTOON, unvaccinated, a stout healthy man, aged about 30, of very intemperate habits, was exposed to small-pox for the first time early in March, 1835; was soon vaccinated; again on the sixth or seventh day after exposure, and every day subsequently till evidence was given of its having taken. He was throughout exposed to a variolous atmosphere, and sickened on the fourteenth day after exposure. He had wilfully refused all preparatory treatment, continuing to live as usual, and

to drink to excess till the eruption appeared ; this was very heavy, and confluent over his whole body and extremities. His face was covered with an erysipelatous-looking inflammation, from which the pock never fairly emerged. In a day or two his face became pale, and no suppurative filling up of the pustules was ever noticed. The concomitant symptoms were of the most malignant grade, and he succumbed on the thirteenth day of the eruption. The progress of the vaccine vesicle, meanwhile, was uninterrupted and unmixed with the surrounding variolous eruption ; it presented a full vesicle of pure lymph, with a depressed or umbilicated centre, terminating in a well formed scab, which could not have been distinguished from that produced in ordinary cases.

I could not conscientiously consider myself justified in verifying on an unprotected subject, what I was inclined to believe possible, that the virus of this scab would have produced the cow-pox.

As I had never before witnessed such a perfect co-existence of the two diseases, I gave the patient and his friends encouragement that the occurrence of the vaccine disease would mitigate the small-pox : a disappointment, which may be useful as a warning in future cases, was, as has been seen, the result.

*Observations respecting the alleged identity of small-pox and varicella.*

IN modern times, at least since the days of Heberden, the chicken-pox has been considered a disease entirely

distinct from the small-pox. Within the last few years the ancient belief that they are identical has been revived in Europe by Prof. Thomson, and has met with the corroborating views of several other writers. In the United States I have known but one or two writers, or indeed few individuals, who have been converts to this doctrine. Dr. Lewis C. Beck, in an account of an epidemic at Albany in 1824, asserts his belief fully on this point. "I have here seen the contagion of chicken-pox giving rise to small-pox and modified small-pox, and I have seen the contagion of small-pox producing modified small-pox and chicken-pox."\*

It is very difficult to meet many of the statements of Dr. Thompson or Dr. Beck, by any plausible explanation of a possible mistake in their diagnosis, or by the supposition that they have confounded chicken-pox with modified small-pox, which would not be a surprising error. They have endeavoured to cut off any such retreat, by stating that those patients who had varicella were in the midst of an infected, variolous atmosphere, without receiving the last disorder, &c.

It is no doubt true, that there is some kind of connection between these forms of disease, as there is between many other forms of the exanthemata, and that they are apt to appear together; but there is ample testimony that small-pox epidemics are met with repeatedly, (uniformly, as it has fortuitously happened as far as my ex-

\* New-York Med. and Phys. Journal, No. 13, for 1824.

rience goes,) without any chicken-pox co-existing; and, *vice versa*, every country practitioner has seen wide-spread varicellous epidemics prevail, while no small-pox was to be found within hundreds of miles.

Add to these the facts, that varicella cannot be communicated by inoculation;\* that vaccination pursues its course uninterrupted and unchanged after varicella, and that varicella is the same disease in those who have and those who have not had small-pox, and there does not seem room for any doubts respecting the entire distinctness of the two diseases.

*On the mode of performing vaccination, the characteristics of the vaccine disease, &c.*

A VAST deal of ingenuity has been wasted in the attempt to shew that the failures of the vaccine disease, both as regards success in its communication and security from its result, are attributable to some error or imperfection in the mode of subjecting the system to its influences. Some writers have attempted to prove that the true vesicle has not been produced, because dry lymph has been the medium of transferring the virus. The fact, however, that in this country this has been the most frequent mode, whilst the protection has been surely not less than in Europe, is conclusive answer to this suggestion.

The number of punctures, their depth, the circum-

\* This point has been strongly contested; but the best modern authorities, as well as personal experiment, have satisfied me that such is the fact.

stance of their having been made with a sharp or obtuse instrument, the part of the body where the insertion is effected, the season of the year, and various other minutiae, have been dwelt upon by experienced and eminent vaccinators, as of high moment in inducing the probability of a successful disease, and the greatest degree of protection.

Common experience shews that all these circumstances are of little or no practical consequence,—being in part visionary and in part impracticable. There has a suggestion (before referred to) been frequently made by writers, that the abrasion of the vesicle by the patient, or the removal of its lymph for the purposes of future vaccination, is calculated to endanger the security to be derived from a perfect vaccine disease. If the lymph of the vesicle is entirely abstracted in either of these modes at an early period of its formation,—that is, whilst it is a local disease merely, its virus not having been absorbed into the system, there seems to exist reason to apprehend that its efficacy would be prevented. Dr. Brown and others detail cases having a bearing on this point, in which a second vaccination was successful, when it was within the recollection of the patient's friends that the vesicle of the former had been disturbed by the vaccinator, in order to obtain supplies of virus. I have experimented on a number of cases, with a view of ascertaining whether or not this caution is well grounded. The vesicle, when the first mark of lymph was apparent, was abraded, and its surface kept continually wiped dry. In no instance,

however, were the constitutional symptoms prevented nor did the susceptibility of the patient remain to the variolous or vaccine affections, as evinced by subsequent inoculation with both. The cases related by others the analogy of other diseases communicated in a similar manner, as syphilis, in which the constitutional affection is sometimes prevented by early cauterization of chancre, as well as the effect of prompt excision of the wounded part in rescuing the sufferer from the consequences of the bite of venomous and rabid animals, would seem to render it expedient for the practitioner to guard against the contingency of failure from this source, since it may be so easily and conveniently done by his resorting for virus to the scab only, thus rendering the laceration of the vesicle unnecessary, or by making two or more punctures, one of which is to be left undisturbed.

The mode of communicating the vaccine disease which will be found most convenient in practice, when the virus from the recent vesicle, or that from the scab, moistened with a drop of tepid water and crushed on a piece of glass is employed, is to make a few slight parallel scratches just through the cuticle, so as to allow an exudation of uncolored or slightly tinged lymph merely, crossed at right angles or obliquely by a similar number, on which the virus is to be rubbed, and the place allowed to become dry before the sleeve is replaced. When the virus, dried on the bit of quill is employed, a slight and very oblique puncture with the point of a lancet, so as not to

draw blood, should be made, into which the point of the quill is to be placed, and retained for a few minutes.

A successful vaccination is characterized by the following appearances.

In from thirty-six to forty-eight hours after insertion, a small red point becomes visible on the spot where the puncture has been made, which yields a sensation to the finger when passed over it, as if a small miliary body were included under the skin,—the redness also disappearing under the pressure.

If marks of inflammation should be evinced within a less time after vaccination, there will be almost a certainty that the operation will fail; so early inflammation being of a common, and not a specific kind.

The redness, if the vaccine action has originated, continues to increase till the fifth day, when the pimple becomes changed to a vesicle, containing a clear, transparent lymph, which in progress assumes an annular form, the centre remaining unaltered, whilst the margin becomes prominently elevated, producing the peculiar umbilicated appearance. This surrounding ring consists of a number of distinct cells, not communicating with each other, as is always evinced in attempting to remove the lymph for the purpose of vaccinating, and which ultimately form the peculiar punctuated indentations, marking the true vaccine cicatrix.

By the eighth day the vesicle is fully formed, the lymph remaining clear and transparent; but in a short time, even a few hours, a change commences in the character

of the vesicular secretion, it becoming turbid and purulent. It is obvious that this point of time should never be passed in procuring virus for further insertion.

At this period commences the distinctive vaccine areola, which consists of a circle of tegumentary inflammation, taking on a deep florid or erysipelatous colour, and extending to a diameter of from one and a half to three inches. The subcutaneous structure becomes hard and painful; a degree of pain and tenderness extends along the course of the absorbent vessels on the inside of the arm into the axilla, the glands of which become tumid and painful. In connection with these local effects, a constitutional sympathy is produced, characterized by langour, chills and heats, anorexia, head-ache, pain in the back and extremities, &c.

These constitutional symptoms are by no means uniformly experienced, especially in the adult—but experience abundantly shews that their presence is not essential in producing the highest immunity.

From the eighth to the twelfth day the disease continues with the symptoms described, which arrive at their height and subside within this period, the contents of the vesicle gradually forming a scab, which continues to dry away until it separates, about the twentieth day.

The vaccine process is by no means without deviation. In some cases the virus seems to lay dormant for even a week before the vesicle is commenced; in others perfectly formed lymph may be abstracted as early as the fifth day.

The scab should be thick, compact, and nearly circu-

lar; of a light mahogany color; brittle rather than tenacious; smooth and polished on its upper, and rough and irregular on its lower, surface. The virus of such a scab, if recently taken, will rarely fail to produce its proper effect.

The cicatrix consequent upon a successful and undisturbed vaccine process, should be small, white, and punctuated with from two to seven or eight indentations, arranged around the circumference of the scar. When the scar is large, irregular, puckered, and wanting these distinctive characters, it is probably the result of, or has been affected by, extended common inflammation. It then, of course, forms no evidence of protection, although, as before remarked, it is no proof that the vaccine disease has not been passed through; it renders it equivocal, and requires to be tested.

When the unequivocal evidence of a regular progress of the vesicle and its resulting cicatrix is wanting, a second vaccination, or the inoculation of the variolous virus, will decide the question. To the latter of these, the double objection obtains, that the practitioner might endanger the origination of the varioloid, if his patient had been vaccinated, and of course unmitigated small-pox to unprotected persons exposed to such patient; or veritable small-pox in the first instance, if the vaccination had proved unsuccessful. A repetition of vaccination must, in such instances, be made; and to prevent public confidence from being weakened and unsettled in this prophylaxis, we believe it should be confined to such cases alone.

In New-England, the grand obstacle to the general diffusion of the universally acknowledged benefits of vaccination, is referable to the fact that little or no interest is evinced by the public, in times of the absence or distance of small-pox, for this protection ;—little or no compensation is offered to the practitioner to induce him to keep himself prepared with the virus—still less to induce him to give that attention to *know* that the disease has been duly undergone, and that the patient does not rest his hope of immunity on the mere fact that the operation of insertion has been performed on him. No statutory provisions have been generally made for vaccination, nor has it been a requisite for admission to public schools and alms-houses, or prior to military enrolment, as has been the case in some countries of Europe, in which the happy result of absolute exemption from small-pox, anticipated by the early propagators of cow-pox, seems to have been realized.

Here, on a somewhat distant alarm of small-pox, the practitioner, after having, perhaps with considerable trouble and expense, provided himself with virus from some of our cities, vaccinates a few individuals, and then finds the business transferred to numerous unprofessional and unqualified persons, whose attempts are in part successful and part nugatory. Naturally disgusted with his thankless endeavours, he allows the whole subject to drop for perhaps years, when an irruption of small-pox finds one half of the population unprotected, and an extended epidemic the result of their ill-judged parsimony.



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